WATER STREET BRIDGE
(Bridge No. 1312)
(Logan-Guyan Bridge)
County Route 119/26, over the Guyandotte River
Logan
Logan County
West Virginia

HAER No. WV-62

HAER
WVA,
23-LOGAN,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Northeast Region
U.S. Custom House
Philadelphia, PA 19106

HAER
WVA,
23-LOGN,
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HISTORIC AMERICAN ENGINEERING RECORD

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WATER STREET BRIDGE
(Bridge No. 1312)
(Logan-Guyan Bridge)

Location: County Route 119/26 over the Guyandotte River, Logan, Logan County, West Virginia.

UTM: 17.412300.4189300
Quad: Logan, West Virginia

Fabricator: American Bridge Company
Pittsburgh, Pennsylvania

Date of Construction: March-November 1934

Present Owner: West Virginia Department of Transportation
Division of Highways
Capital Complex
Room 109, Building 5, Charleston, West Virginia 25305

Present Use: Vehicular and Pedestrian Bridge

Significance: The Water Street Bridge is significant for its association with the civil and economic development of the city of Logan, West Virginia. Since its construction in 1934 the bridge has been a primary crossing of the Guyandotte River leading into downtown Logan. In addition, the bridge was fabricated and erected by the American Bridge Company of Pittsburgh, Pennsylvania, one of the premier bridge manufactures of the twentieth century. The Water Street Bridge was constructed with funds appropriated under the National Industrial Recovery Act of 1933 and administrated by the Public Works Administration, both of which were devised by the presidential administration of Franklin Delano Roosevelt to help with industrial recovery during the Depression of the 1930s.

Project Information: This documentation was undertaken in 1995 in accordance with the Memorandum of Agreement by the West Virginia Department of Transportation as a mitigative measure prior to the replacement of the bridge.

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Overview

The Water Street Bridge consists of three 220' steel Parker through truss spans. The bridge was constructed between March and November 1934 by the American Bridge Company of Pittsburgh, Pennsylvania. The bridge is representative of truss bridges built in the United States during the late nineteenth and early twentieth centuries. The Water Street Bridge spans the Guyandotte River at the confluence of Island Creek, at Logan, West Virginia and is essential to traffic flow in and out of the city of Logan since it is the primary entrance leading into the downtown area.

Logan, West Virginia

Logan, West Virginia is nestled in the mountains of southern West Virginia at the junction of the Guyandotte River and Island Creek. The town site is rich in history, being a natural encampment site for Native Americans, pioneers, and fur traders. The city of Logan lies within Logan County which was created in 1824 and formed out of the counties of Kanawha, Cabell, Giles, and Tazewell. In its original form Logan County extended well beyond its present day boundaries to include all of the present counties of Logan, Mingo, Wyoming, and parts of McDowell, Mercer, Raleigh, Fayette, Boone, Lincoln, and Wayne. The first permanent settlement of the area occurred in 1799 when William Dingess built a log cabin at the present site of Deskins Addition. By 1820 there were approximately two thousand settlers living in what was to become Logan County.[1]

The city of Logan, once established, began to grow. Historically, Logan has undergone several name changes. In 1826 the Virginia assembly designated the present site of the city as the county seat and named it Lawnsville. In 1852 the name was changed to Aracoma. In 1907 Aracoma was incorporated and the name was changed to Logan, in honor of the Mingo chief of the same name.[2]

Extractive industries were key to the development of Logan. Timber provided the county's first industry. The original hardwood forests were reported equal in stand and

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1. G.T. Swain, *History of Logan County, West Virginia* (Logan, West Virginia: G.T. Swain, 1927), 85-86.

2. Edwin Albert Cubby, "The Transformation of the Tug and Guyandot Valleys: Economic and Social Change in West Virginia," (Ph.D. dis., Syracuse University, 1962), 283-293.

quality to those of any part of the state. By 1900 several timber companies owned large tracts of virgin timber in Logan County which they were cutting and transporting to market by rafting it down the Guyandotte River.

The most important industry to affect the city of Logan was coal mining. Settlers to the area long recognized the value of the coal. In 1852 a Virginia incorporation was given to the Great Sandy Mining and Manufacturing Company with holdings in Wayne and Logan counties. By 1890, dozens of northern capitalists had purchased leases on coal lands. While the Guyandotte was suitable for the rafting of logs, it was too small and shallow to be used in the transportation of coal. Therefore, due to its isolation, the coal fields of Logan County were some of the last to be developed in the state. It was not until 1904 that the Guyandotte Valley Railroad was constructed into Logan County. Mines were ready for operation when the railroad reached the county and the first shipment of coal came from the United States Coal and Oil Company in December 1904.

For the people of Logan County the decade after 1904 was a period of transition as adjustments were made to new conditions created by the coming of the railroad and the rise of the coal mining industry. The city of Logan had remained a small, almost insignificant settlement until the construction of the Guyandotte Valley Railroad. In 1900 Logan had a population of only 444. By 1910 its population had increased to 1,640 and in the following decade it increased to 2,998. It's population has remained steady since that time. The 1980 census reported 3,311 Logan residents.

Along with the opening of the coal fields, the development of a viable road and bridge system has been key to the city of Logan's economic development. Between 1904 and 1914, in response to the promise of increased coal production, Logan County's railroad mileage more than doubled, which improved not only the movement of coal but also people. While travel by rail improved, travel by road remained as difficult as ever. The first motor taxis made their appearance in Logan County sometime after 1910 but because of the poor condition of county roads and the limited number of bridges accessible to automobiles, service had to be limited to the county seat except during dry periods when the streams and were low, which allowed for easy crossing, and the roads somewhat more accessible. Roads were in such poor condition that the city council fixed the maximum speed at fifteen miles per hour on city streets. Elsewhere in the county the conditions of the road made it unnecessary to set a maximum rate. To cross the Guyandotte River, even at the city of Logan, a ford or ferry still had to be used. In 1911 an attempt to have the county build three bridges failed as earlier efforts had, and it was not until 1918 that a bridge finally spanned the river at the city of Logan.

The town of Logan has changed since 1904, most notably with the construction of new roads and highways leading into the city, and the erection of new businesses and buildings. However, much of the cities historic fabric remains intact. Today the importance of the railroad has declined, but mining still is a significant aspect of Logan's economy, albeit surface mining.

General Bridge Description

The Water Street Bridge consists of three simple span riveted steel Parker through trusses each measuring 220' - 0 3/8" along the centerline with an overall bridge length (backwall-to-backwall) of 671' - 4 7/8". Steel riveted floorbeams supporting steel stringers transfer loading from the 7" concrete deck to the trusses. A 5' sidewalk on the upstream side, formed with the roadway deck, is supported by two lines of stringers on truss mounted brackets. The bridge has a 24' roadway and a vertical clearance of 14' - 3". In the original fabrication and construction of the bridge, 463 cubic yards of class A concrete was used, along with 72,020 pounds of reinforcing steel and 715 tons of structural steel.[3]

The bridge is supported by two full height concrete, steel reinforced tapered column piers and abutments. Construction of the substructure utilized 1,941 cubic yards of class A concrete, 200 cubic yards of class B concrete and 136,050 pounds of reinforcing steel.[4]

Paint for the Water Street Bridge was originally furnished by the Detroit Graphite Company. Red Lead Paint was used for the first field coat and Dark Aluminum Graphite Paint was used for the second coat.[5]

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3. *The Logan Banner*, 27 November 1934; L.L. Jemison, Bridge Engineer, to Mortimer W. Smith, Chief Engineer, 22 November 1934, West Virginia Department of Transportation, Division of Highways, File on Water Street Bridge, Capital Complex, Charleston, West Virginia (hereinafter WVDOT).

4. L.L. Jemison, Bridge Engineer, to Mortimer W. Smith, Chief Engineer, 22 November 1934, WVDOT.

5. D. Hammerschmidt, Purchasing Agent for American Bridge Company, to H.C. Nutting Company, 26 July 1934, WVDOT.

Truss Bridge Construction

Bridges, especially the iron and steel bridges of the late nineteenth and early twentieth centuries, were crucial to America's industry and economy. Deriving their structural form from earlier-covered bridges, they were built with materials that did not require extensive protection from the elements and that provided a strong, safe structure at a cost with the financial capabilities of many communities or states. These bridges were most often prefabricated by specialized bridge companies and then erected throughout the country in both rural and urban settings. As a result, their presence provides a unifying structural and visual element within the American landscape.

The most common bridge built between 1850 and 1940 was the metal truss bridge, a design that used many small pieces or members to make a long truss that provided the length and strength necessary for the bridge. There were various ways these small members could be arranged, and it is the arrangement of these members within the bridge structure that determines the specific truss form. The earliest bridge trusses date back over five hundred years and were constructed of wood. The King post and the Queen post represent the basic forms of these trusses, and their modern day descendants can still be seen in very short bridges in rural areas. In 1803 Theodore Burr of Pennsylvania constructed a bridge which combined several King post trusses with a wooden arch, which resulted in a stronger bridge. Burr's system had the bulk of the load taken by a timber truss frame, with a light arch running through the depth of the frame for strengthening.[6] Following Burr's patent, other bridge builders modified his design and utilized a wooden arch with truss configurations other than the multiple King post. The first modern truss design not to employ the arch was the Town Lattice truss, patented in 1820 by Connecticut architect Ithiel Town.[7] The Town truss utilizes closely spaced diagonal timbers to produce a rigid network of significant strength.[8] Because wooden trusses were susceptible to fire and insect damage, beginning in the 1830s bridge builders turned to iron.

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6. Martin Hayden, *The Book of Bridges* (New York: Galahad Books, 1976), 52; T. Allan Comp and Donald Jackson, "Bridge Truss Types: A Guide to Dating and Identifying," *Technical Leaflet*: 2.

7. David Weitzman, *Traces of the Past: A Field Guide to Industrial Archaeology* (New York: Charles Scribner's Sons, 1980), 59.

8. Comp and Jackson, "Bridge Truss Types," 2.

The first patent truss to incorporate iron into the basically timber structure was the Howe Truss. Patented in 1840, the essential feature of the Howe Truss was its use of metal verticals functioning as tension members and wooden diagonals functioning as compression members. The basic design of the Howe Truss was used, with modifications, late into the nineteenth century.

Overall, the century from 1780 to 1880 was an age of iron, in increasing quantity and increasingly sophisticated designs. However, because of several accidents caused by the collapse of iron bridges, including the 1865 collapse of an all iron Howe Truss built in Ashtabula, Ohio which resulted in the death of ninety-two people, enthusiasm for iron trusses faded.[9] With the development of steel in the late nineteenth century, the use of iron for bridge construction came to a crashing halt.

Steel proved to be more versatile than any previously used material in bridge construction. It enabled all the established bridging methods to reach new peaks of development. Steel also provided its own possibilities of new forms, and enabled concrete, the other new material of the late nineteenth century, to evolve as an effective medium.

The majority of steel trusses in the United States are of two primary forms, the Pratt and the Warren. Both forms date back to the 1840s, although most of the remaining bridges utilizing these trusses were built after 1900. After 1850 many different trusses were promoted, but, "in the ensuing competition between bridge builders, the Pratt and Warren Trusses gradually demonstrated their versatility, durability, and economic desirability to such an extent that by the early twentieth century, almost all bridge trusses were constructed using variations of one of these forms."[10]

The first scientifically patented truss was the Pratt Truss which was patented in 1844 by Thomas and Caleb Pratt and is distinguished by vertical members acting in compression and diagonals acting in tension. This design feature reduced the length of the compression members to help prevent them from bending or bucking[11]. The most common type of early twentieth century truss bridge was the pin-connected through Pratt.

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9. Hayden, *The Book of Bridges*, 85.

10. Comp and Jackson, "Bridge Truss Types," 3.

11. Hayden, *The Book of Bridges*, 84; Comp and Jackson, "Bridge Truss Types," 3.

Many twentieth century trusses, including the Parker and Camelback, maintain the Pratt configuration of compression and tension members, while modifying the shape of the top and bottom chords. The Parker Truss is basically a Pratt design with a polygonal top chord. Because of its arched top chord, the bridge is stronger than a regular Pratt Truss even though it is constructed with the same amount of material. The Camelback truss was designed with the Parker Truss in mind, although unlike the Parker Truss, it has an arched top cord formed with five slopes. The Camelback design created greater standardization of its members and better stress distribution, and in most cases, it was the most economical truss for many highway and railroad spans.[12] The Pratt Truss and its progeny became an American standard and represent the overwhelming number of truss bridges built during the late nineteenth and early twentieth centuries.

Water Street Bridge

The opening of the Water Street Bridge on November 30, 1934 ended several years of political agitation on the part of the Logan Chamber of Commerce and both state and federal representatives over the need for a new bridge in the city of Logan, West Virginia. By 1932 it had become clear to state officials that there was an urgent need to replace the two bridges leading into Logan. These bridge were situated approximately eight hundred yards upstream from the current site of the current Water Street Bridge. The bridges were condemned by state and county engineers and signs were posted by court order warning pedestrians and motor vehicles and limiting the legal load that could pass over the bridges. Despite the poor condition of the bridges, the state government, which was caught up in the stranglehold of the Great Depression of the early 1930s, was unable to authorize funds for its replacement and President Herbert Hoover refused to release federal dollars for the development of infrastructure.

In the absence of any economic recovery, and burdened with a public resentful of the mounting financial crisis, Herbert Hoover was defeated by Franklin Delano Roosevelt in the 1932 presidential election. Inaugurated in March 1933, the Roosevelt years began on a note of feverish activity and high excitement. Enjoying overwhelming majorities in Congress, Roosevelt proposed a staggering array of emergency measures in his early months in office. Roosevelt's strategy involved three main components, industrial recovery, agricultural recovery, and short-term emergency relief for the unemployed. One such measure was the National Industrial Recovery Act (NIRA) passed in June 1933. The NIRA appropriated some $3.3 billion for a federal public works program that would employ

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12. Comp and Jackson, "Bridge Truss Types," 5.

the jobless and increase consumer purchasing power by pumping money into the economy. To oversee this vast program the NIRA created the Public Works Administration (PWA). Under the leadership of Secretary of the Interior Harold Ickes, the PWA eventually spent more than $4 billion on some thirty-four thousand public works projects, most of which involved the construction of dams, bridges, and public buildings.[13]

It was through funds allocated by the PWA that the Water Street Bridge was built. Prior to receiving bids and awarding contracts, however, two key stumbling blocks had to be overcome; first, the designation of the Guyandotte River as a navigable waterway, and second, the alignment of the piers supporting the bridge. The designation of the Guyandotte River as navigable perplexed local leaders. One unnamed local politician complained "notwithstanding the fact that there were already two bridges over the stream within a distance of 500 yards, it was necessary to go through all of the war department red tape although there had not been a craft larger than a canoe pass up or down the old river within a quarter of a century."[14] As for the alignment of the supporting piers the original bridge design called for the piers to be placed perpendicular to flow of the Guyandotte River. Because of concerns of erosion, however, the United States Army Corps of Engineers would not issue a building permit until the design was altered to an acceptable skew of 15 degrees 34'.[15]

After lengthy delays federal approval for the bridge was given December 7, 1933 and after several months holdup for planning and site specifications bids were received on March 7, 1934 and contracts were awarded March 23, 1934 to the American Bridge Company of Pittsburgh, Pennsylvania for the building of the superstructure and to Oscar Vecellio of Itmann, West Virginia for the substructure. The bid price for the superstructure was $68,955, while the bid price for the substructure was $49,912.

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13. Anthony J. Badger, *The New Deal: The Depression Years, 1933-1940* (New York: The Noonday Press, 1989), 66-117; Paul K. Conkin, *The New Deal*, (Harlington Heights, Illinois: Harlan Davidson, Inc, 1975).

14. *The Logan Banner*, 27 November 1934.

15. L.L. Jemison to Mortimer W. Smith, Chief Engineer, 22 November 1934; Chester W. Smith, Chief, Operations Section, United States Engineer Department to L.L. Jemison, Bridge Engineer, State Road Commission of West Virginia, 16 March 1931; Chester W. Smith, Chief, Operations Officer, United States Engineer Department to L.L. Jemison, Bridge Engineer, State Road Commission of West Virginia, 14 March 1932 WVDOT.

The American Bridge Company was one of the premier bridge companies of the early twentieth century. The company was formally organized by J.P. Morgan and Company and incorporated in New Jersey on April 14, 1900. The company remained independent until April 1, 1901 when it became a subsidiary of United States Steel Corporation. Corporate headquarters were in New York City until May 16, 1901 when they were moved to Philadelphia, where they remained until April 1, 1904 when they were moved to Pittsburgh. The American Bridge Company fabricated, or fabricated and erected, the steel for several of the world's largest bridges, including the San Francisco-Oakland Bay Bridge, the Hell Gate Bridge in New York, and the Suspension Bridge at Point Pleasant, West Virginia.

After years of delay the Logan-Guyan Bridge opened to traffic on November 30, 1934. "Gala Day for Logan When Fine New Steel and Concrete Bridge is Opened and Gives New Gateway Into the City," read the headlines from the *Logan Banner*.[16] Logan officials greeted the opening of the new bridge with a gala celebration of "whistles, bells and sirens," which included a luncheon at the new Aracoma Hotel, a band concert on the courthouse square, and a parade through town.

According to new reports approximately five thousand people attended the opening ceremonies. In addition to local residents and several high school bands, officials from the southern and central West Virginia communities of Huntington, Charleston, Williamson, Welch, Beckley, Bluefield, Madison, and Man were in attendance. A large delegation of state officials including State Road Commissioner E.L. Bailey, State Tax Commissioner Fred L. Fox, State School Superintendent W.W. Trent, Superintendent of Public Safety P.D. Shingleton, Superintendent of the Department of Mines N.P. Rinehart, and Captain H.N. Rexroad of the State Department of Public Safety offered words of congratulations to the city of Logan.

The opening of the Water Street Bridge was "The Greatest Day in the History of Logan" not only because it replaced an aging and unsafe bridge, but because the bridge represented "the dream of many years for an imposing bridge gateway to the county metropolis. . . ."[17] State Road Commissioner Ernest Bailey captured the importance of the bridge to the community when he said "Make no mistake, my friends, this is your bridge- a bridge to which you were fairly and justly entitled, and for which, unfortunately you had

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16. *Logan Banner*, 27 November 1934.

17. *Logan Democrat*, 29 November 1934.

to wait to long. . . . this bridge typifies the difference between the old and the new. It symbolizes the onward march of science in the service of mankind, and its erection here in the one of the world's richest coalfields brings forcibly to mind the alluring possibilities of a richer and more abundant life and a higher civilization. . . ."[18]

The importance of the Water Street Bridge to the city of Logan cannot be underestimated. The Huntington *Herald-Dispatch* summed it up best when it reported "the new bridge eliminates the two present outmoded and structurally unsound bridges that span Guyandotte River and Main Island Creek and removes the hazard of a narrow, tortuous and traffic-clogged route that for years has impeded the flow of vehicular traffic into or out of Logan. . . ."[19]

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18. *Logan Banner*, 4 December 1934.

19. Huntington *Herald-Dispatch*, 30 November 1934.

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A. Engineering Drawings

Drawings in Bridge Files at West Virginia Department of Highways, Charleston, West Virginia: 1932, April. Water Street Bridge, cross section of stream and elevation of bridge looking south.
One sheet. State Road Commission, Charleston, West Virginia.

B. Historic Views (no historic views found)

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West Virginia State Archives, Charleston, West Virginia.

C. Bibliography

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Logan Banner, November-December 1934.

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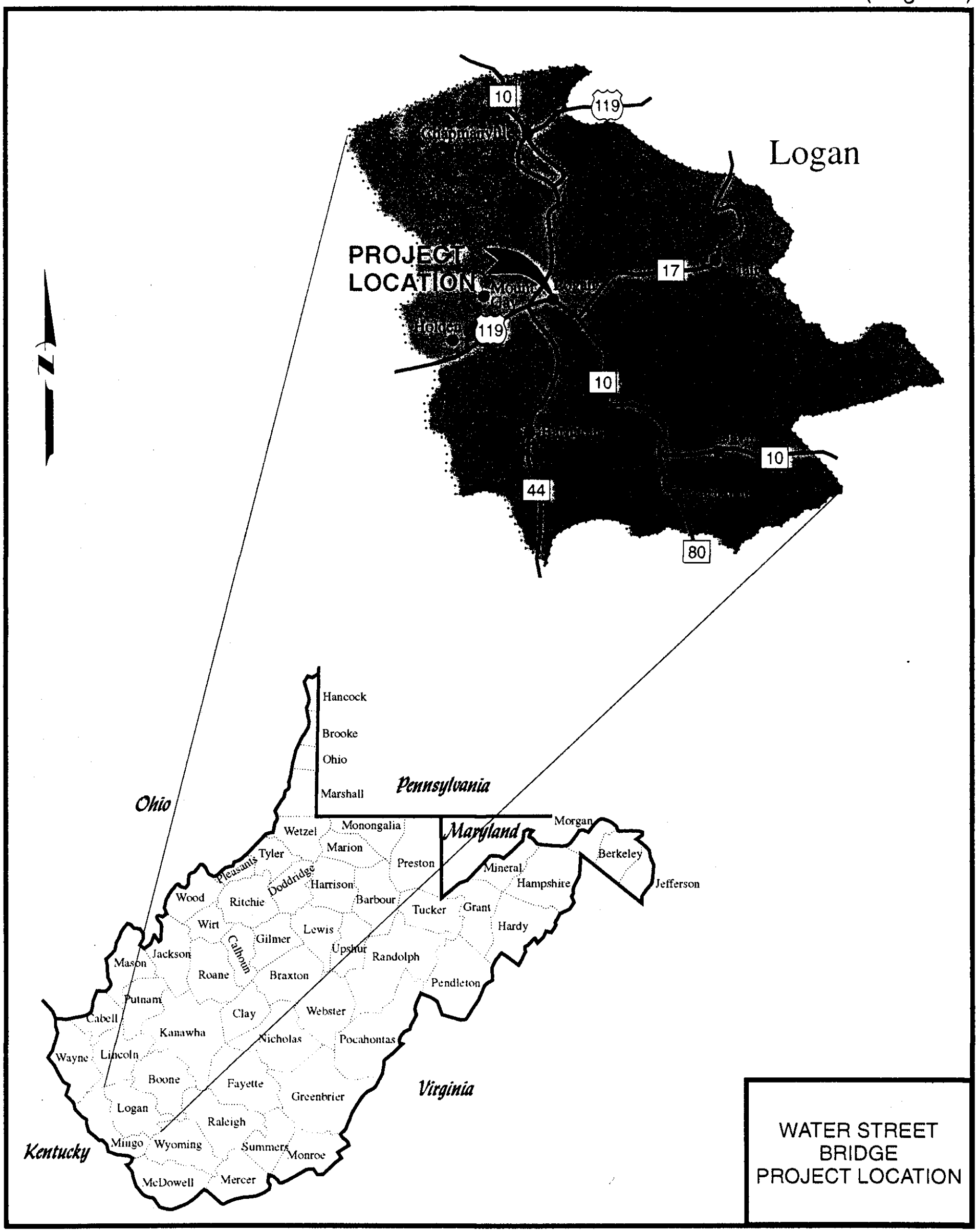
PROJECT LOCATION
(Page 13)



WATER STREET BRIDGE
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SITE PLAN
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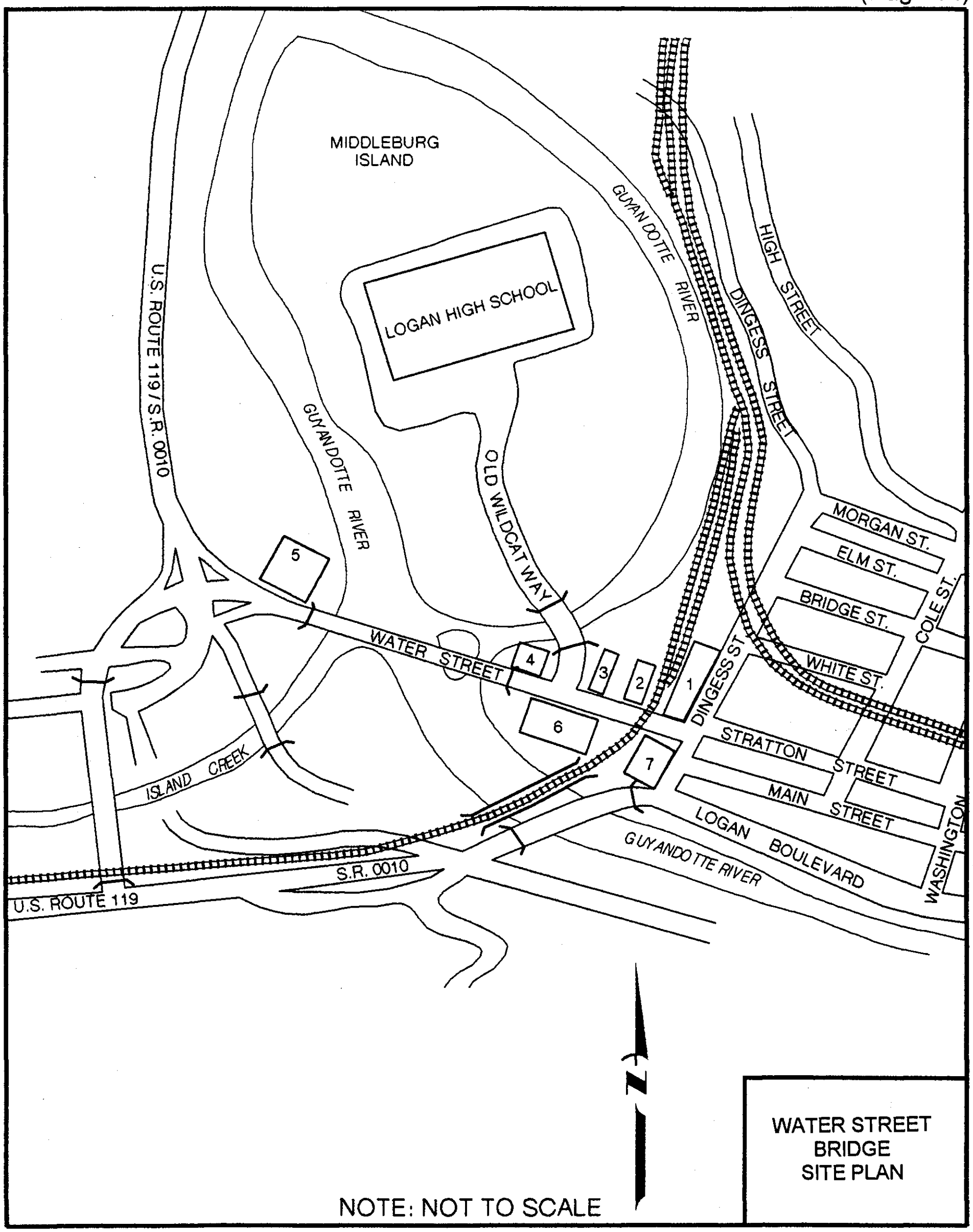

WATER STREET BRIDGE
(Bridge No. 1312)
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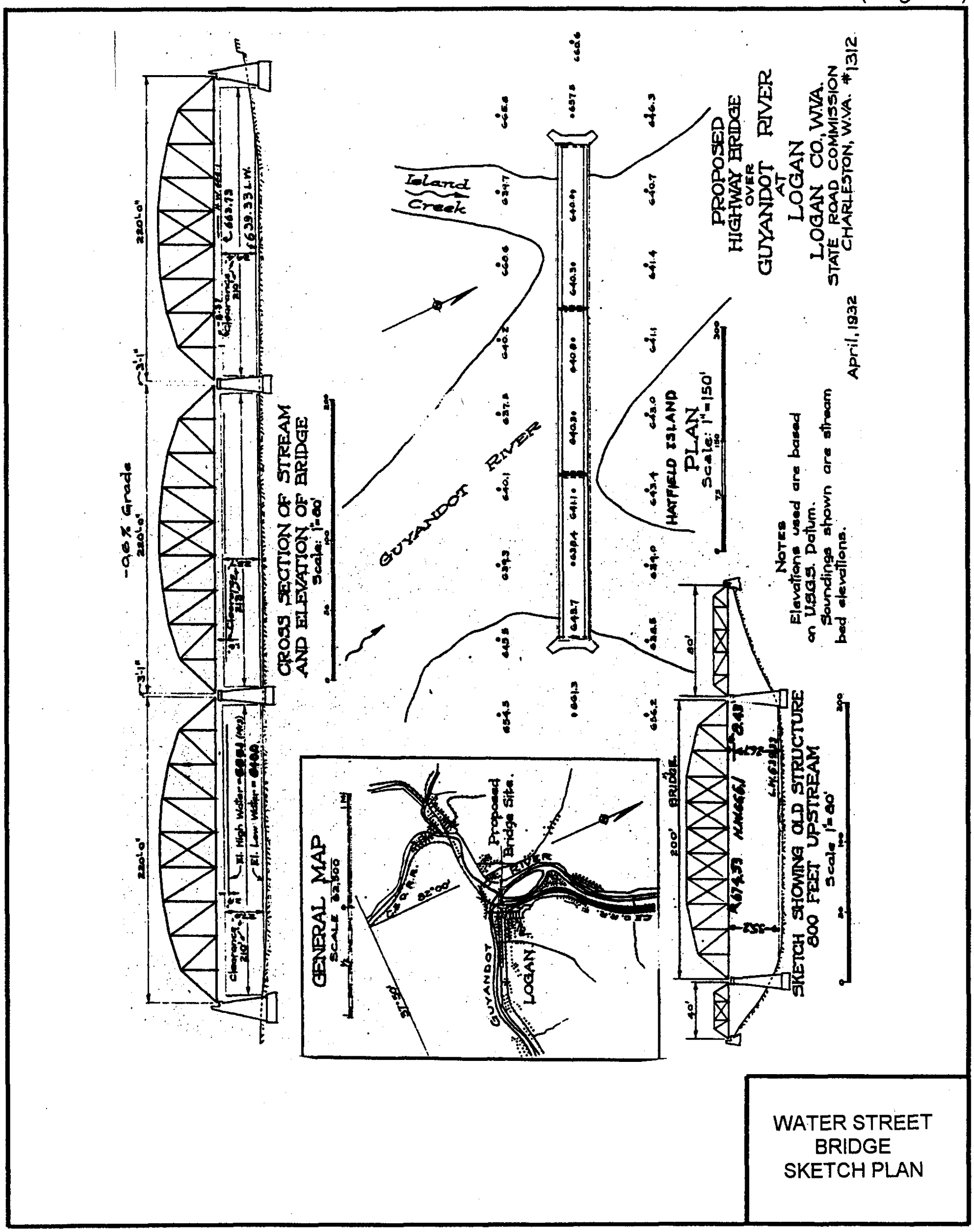
SKETCH PLAN
(Page 15)



KEY TO BUILDINGS, WATER STREET BRIDGE SITE PLAN, 1995

Building No.	Building Name/Use
1	Various Small Businesses
2	Subway
3	Wendy's
4	Pacific Financial
5	McDonalds
6	Bowling Alley
7	Exxon Gas Station